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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/588,297	11/02/2006	Naoyuki Kobayashi	128977	8374

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EXAMINER
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ASFAW, MESFIN T

ART UNIT	PAPER NUMBER
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2882

NOTIFICATION DATE	DELIVERY MODE
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02/04/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

OfficeAction25944@oliff.com  
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<b>Office Action Summary</b>	<b>Application No.</b> 10/588,297	<b>Applicant(s)</b> KOBAYASHI ET AL.	
	<b>Examiner</b> Mesfin T. Asfaw	<b>Art Unit</b> 2882	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 August 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-69 is/are pending in the application.
- 4a) Of the above claim(s) 5,7,11-35,37-43 and 45-69 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4,6,8-10,36 and 44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>08/02/2006, 05/30/2007, 11/13/2008</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

Acknowledgement is made to a preliminary amendment filed on 08/02/2006.

Claims 1-69 are pending in this application.

#### ***Election/Restrictions***

1. Applicant's election with traverse of Group I and Species A in the reply filed on 08/13/2009 is acknowledged. The traversal is on the ground(s) that Independent claim 1 is generic to independent claim 30. Applicant's argument in this regard is persuasive. Therefore, claims 30-35, 65 and 68 will be considered. Applicant's argument with regard to Species D-F is also persuasive. The claims that are associated with Species D-F are not members of the Group I invention. Therefore, the restriction to Species D-F is withdrawn.

2. Applicant's argument that the subject matter of all claims is sufficiently related that a thorough search for the subject matter of any one Group of claims would encompass a search for the subject matter of the remaining claims. This is not found persuasive because the various temperature adjustment systems and their technical applications is different from each other and they are not in the same classification. The claims as Grouped are patentably distinct and are sufficiently unrelated as to create a serious search burden.

3. Therefore, the requirement is still deemed proper and is made FINAL.

#### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Nei'386 [US 5864386 A, hereafter Nei'386].

**As per Claim 1**, Nei'386 teaches an exposure apparatus (See fig. 1) which exposes a substrate (wafer 10) by radiating an exposure light beam onto the substrate, the exposure apparatus comprising:

a substrate stage (wafer stage 18) which has a substrate-holding member (a wafer holder 12) for holding the substrate and which is movable while holding the substrate by the aid of the substrate-holding member; and

a temperature adjustment system (temperature control unit 34) which performs temperature adjustment for the substrate-holding member (Column 3 line 66 – Column 4 line 51).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2-4, 6, 8-9, 11-13, 36, and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nei'386 as applied in claim 1 above in view of Tabarelli et al. [US 4509852 A, hereafter Tabarelli].

**As per Claims 2-4, 6, 9, 11-13, 36,** Nei'386 does not explicitly teach irradiating an exposure light beam onto the substrate through a liquid. Wherein

the temperature adjustment system performs the temperature adjustment for the substrate-holding member depending on a temperature of the liquid to be supplied onto the substrate such that heat transfer is reduced between the substrate and the liquid on the substrate.

Tabarelli teaches the use of an immersion liquid. wherein the liquid 6 cleans the semiconductor disk 8 retained on the support 1 by means of vacuum lines 9 and keeps the temperature of the disk constant, feeding pipes 4 and discharge pipes 5 leading to the container 2 create constant conditions. Said feeding- and discharge pipes, which are flexible and allow the displacement in the directions X and Y required for the step-by-step exposure as well as the alignment in the Z-direction, belong to a cycle comprising a reservoir, which has not been illustrated, a pump 10, a filter 11 and means 12 effecting a temperature increase or decrease depending on the measured temperature (Column 6 lines 28-42).

Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to incorporate the immersion system of Tabarelli in the exposure system of Nei'386 so that irradiating an exposure light beam onto the substrate through a liquid is possible. Wherein

the temperature adjustment system of Nei'386 which performs the temperature adjustment for the substrate-holding member would change the temperature of the liquid which has a physical contact with the substrate-holding member and in turn

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changes the temperature of optical member which has a physical contact with the immersion liquid.

**As per Claim 8**, Nei'386 as modified by Tabarelli does not explicitly teach the temperature adjustment system uses a liquid which is same as the liquid to be supplied onto the substrate to perform the temperature adjustment for the substrate-holding member.

However, the combined teaching of Nei'386 and Tabarelli teaches that a liquid with the same temperature is supposed to be delivered both to the substrate stage, and in the space between the optical element and the substrate such that heat transfer between the stage and the wafer and between the wafer and the liquid disposed above the wafer is minimized.

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to employ a liquid supply system that can deliver a liquid to the substrate-holding member and onto the substrate to reduce the chance of a temperature variation between the two liquids and reduce the cost by using the same supply unit.

**As per Claim 44**, Nei'386 as modified by Tabarelli disclosed the method as claimed, because under the principles of inherency, if a prior art device, in its normal and usual operation, would necessarily perform the method claims, then the method claimed will be considered to be anticipated by the prior art device. When the prior art device is the same as a device described in the specification for carrying out the

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claimed method, it can be assumed the device will inherently perform the claimed process. In re King, 801 F.2d 1324,231 MPEP 2112.02”

8. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nei’386 as applied in claim 1 above in view of Mori et al. [US 5063582 A, hereafter Mori].

**As per Claim 10**, Nei’386 does not explicitly teach a temperature sensor which measures a temperature of the substrate-holding member.

Mori teaches a temperature sensor 15 for sensing the temperature of the wafer chuck 5 is additionally provided. Also, added is a signal line 16 for transmitting the detected temperature to the flow controller 10 (Column 3 line 58 – Column 4 line 2).

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to incorporate a temperature sensor of Mori which measures a temperature of the substrate-holding member in the temperature control system of Nei’386 in order to provide an exposure apparatus a temperature control system by which the temperature rise of the wafer during the exposure can be limited.

9. Claims 30-35, 65 and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nei et al. [US 20050219489 A1, hereafter Nei’489] in view of Nei’386.

**As per Claim 30, 65 and 68**, Nei’489 teaches an exposure apparatus (See fig. 1) which exposes a substrate P by radiating an exposure light beam onto the substrate through a liquid (Abstract), the exposure apparatus comprising:

a first substrate stage PST1 which has a substrate-holding member for holding the substrate and which is movable while holding the substrate by the aid of the substrate-holding member;

a second substrate stage PST2 which has a substrate-holding member for holding the substrate and which is movable while holding the substrate by the aid of the substrate-holding member (See fig. 6, Para 80);

a measuring station (a measurement/exchange station) which performs measurement for the substrate held by one of the stages;

an exposure station (the first stage) which performs exposure for the substrate held by the other of the stages.

Nei'489 does not explicitly teach temperature adjustment systems which are provided for the first substrate stage and the second substrate stage respectively and which perform temperature adjustment for the substrate-holding member of each of the stages in the measuring station.

Nei'386 teaches circulation paths 30 and 32, through which a heat medium circulates, are installed in the wafer holder 12 and the wafer table 14. The circulation paths 30 and 32 are connected to temperature control units 34 and 36, respectively, and arranged so that a heat medium, such as a liquid or air, whose temperature is controlled by the temperature control units 34 and 36, flows through the circulation paths 34 and 36 (Column 4 lines 15-23).

Thus, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to incorporate the temperature adjustment system of Nei'386 in the twin stage system of Nei'489 such that to perform temperature adjustment for the substrate-holding member of each of the stages in order to avoid the influence due to temperature fluctuation and improve the accuracy of exposure operation.



**As per Claim 31**, Nei'489 teaches the measurement for the substrate in the measuring station includes measurement of surface position information about a surface of the substrate (Para 80).

**As per Claim 32**, Nei'489 teaches the measurement for the substrate in the measuring station includes detection of an alignment mark on the substrate (Para 80).

**As per Claim 33**, Nei'489 in view of Nei'386 does not explicitly teach the temperature adjustment system performs the temperature adjustment for the substrate-holding member before performing the measurement for the substrate.

However one of ordinary skill in the art would have adjust the temperature for the substrate-holding member before the measurement takes place in order to create similar temperature condition during measurement and exposure operations.

**As per Claims 34-35**, Nei'489 in view of Nei'386 does not explicitly teach the temperature adjustment system performs the temperature adjustment for the substrate-holding member depending on a temperature of the liquid supplied from the liquid supply mechanism.

However, the combined teaching of Nei'489 and Nei'386 teaches that a liquid with the same temperature is supposed to be delivered both to the substrate stage and in the space between the optical element and the substrate such that heat transfer between the stage and the wafer and between the wafer and the liquid disposed above the wafer is minimized.

Therefore, it would have been obvious, to one of ordinary skill in the art, at time the invention was made, to form a liquid supply system that can deliver a liquid to the

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substrate-holding member and onto the substrate to reduce the chance of a temperature variation between the two liquids and reduce the cost by using the same supply unit.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mesfin T. Asfaw whose telephone number is 571-270-5247. The examiner can normally be reached on Monday to Friday, 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mesfin T Asfaw/  
Examiner, Art Unit 2882

/Edward J Glick/  
Supervisory Patent Examiner, Art Unit 2882